OFFICE OF ENVIRONMENTAL ~~ASSESSMENT~~ SERVICES
REMEDIATION SERVICES DIVISION

SECTION: ADM PROJECT: DUINDE BAYOU ORIGINATOR: PERCY HARRIS
DATE: 02-10-10 AI#: 7443 OTHER #:

| | Req'd. | Signature | Date | Comments |
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| Section Mgr./Supvr. | ☐ | | | |
| Adm. Assistant | ☐ | | | |
| Administrator | ☑ | | 1/10/2010 | |
| Legal | ☐ | | | |
| Other ( ) | ☐ | | | |
| Assistant Secretary | ☐ | | | |
| Deputy Secretary | ☐ | | | |
| Secretary | ☐ | | | |
| Additional Comments | | | | |

# The Louisiana Department of Environmental Quality

# Draft Decision Document
# For The
# Final Remedy
# Of
# Bayou D'Inde Site
# Agency Interest #7443

## SECTION 1. INTRODUCTION

A Remedial Investigation (RI) was conducted for the Calcasieu Estuary in Calcasieu Parish, located in the southwestern corner of Louisiana. For the purposes of the RI, the Calcasieu Estuary study area extends from the saltwater barrier located north of Lake Charles to Moss Lake, and is situated north of the intersection of the Calcasieu River Ship Channel and the Intercoastal Waterway. The city of Lake Charles, Louisiana and several other smaller neighboring cities are located within the study area. The estuary is created by saltwater migrating north from the Gulf of Mexico via the Calcasieu River and freshwater draining toward the Gulf of Mexico from numerous inland rivers, bayous, and lakes.

The RI was conducted by the U.S. Environmental Protection Agency (EPA) Region VI addressing potential threats to human health and the environment related to releases of organic and inorganic chemicals to the estuary. The RI sampling and analysis was conducted in two phases; from December 1999 to March 2000 for Phase I, and from November 2000 to January 2001 for Phase II.

The RI report was finalized on August 29, 2003. Results of the RI indicated 85% of the Estuary Study Area did not require further action. However, five areas within the Calcasieu Estuary including Bayou d'Inde were identified as requiring further response action. The RI also identified industries with historical and or current permitted discharges into Bayou d'Inde.

The Louisiana Department of Environmental Quality (LDEQ) and EPA Region VI signed a Memorandum of Agreement (MOA) on May 6, 2003 designating LDEQ as the lead agency for oversight of corrective action of the Bayou d'Inde site.

The Bayou d'Inde Group (PPG Industries, Inc., CITGO Petroleum Corporation, Occidental Chemical Corporation, and Westlake Polymers LP) entered into a Cooperative Agreement with LDEQ to perform a Corrective Action Study (CAS) for Bayou d'Inde (the "Site," as defined in the Cooperative Agreement). The purpose of the CAS is to evaluate alternatives for addressing potential risks posed to ecological and human receptors as a result of exposure to sediment-based contaminants of concern (COCs) and to provide the basis for selecting a remedial action from among the alternatives evaluated. A Draft Corrective Action Study Report (Anchor 2006b) was submitted to LDEQ on October 5, 2006. A revised Corrective Action Study Report was

submitted to LDEQ on July 17, 2008. The revised report incorporated comments by LDEQ, the U.S. Environmental Protection Agency Region 6 (EPA), and the National Oceanic and Atmospheric Administration (NOAA) dated March 13, 2008 (which superseded previous comments, dated January 9, 2007). LDEQ transmitted combined agency comments on the revised Corrective Action Study Report to the Bayou d'Inde Group in a letter dated July 8, 2009. This current version of the Corrective Action Study Report incorporates these latest agency comments.

The revised Corrective Action Study Report documents the development and evaluation of corrective action alternatives for Bayou d'Inde in compliance with the requirements of the Cooperative Agreement.

Several documents have been prepared and submitted to LDEQ to support the Bayou d'Inde CAS, including:

- Work Plan for the Delineation of Areas of Investigation, Development of Preliminary RECAP Standards, and Performance of a Corrective Action Study (CAS Work Plan; Anchor 2004)
- Technical Memorandum: Delineation of Areas of Investigation and Proposed Preliminary RECAP Standards for Bayou d'Inde (Anchor 2005a)
- Work Plan Addendum: Draft Sampling and Analysis Plan (Work Plan Addendum; Anchor 2005b), which was modified by the Sampling and Analysis Plan Addendum (Anchor 2005c)
- Data Summary Report, Comparison of Pre- and Post-Hurricane Rita Sediment Chemistry (Anchor 2006a)
- Draft Corrective Action Study Report (Anchor 2006b)
- Supplemental Sampling and Analysis Plan (Anchor 2007)

## SECTION 2. SITE LOCATION

Bayou d'Inde is greater than nine miles long and is located in the northern portion of the Calcasieu Estuary, west of the city of Lake Charles, Louisiana. Bayou d'Inde's headwaters originate in the western portion of Sulfur, Louisiana near the Interstate 10 Bridge. Bayou d'Inde flows primarily east-southeast and empties into the Calcasieu River Ship Channel southwest of Coon Island. Bayou d'Inde extends from the confluence of Little Bayou d'Inde to the Calcasieu River Ship Channel, including the small intermediate marshes along the banks of Bayou d'Inde near the confluence of Maple Fork Bayou and the more saline Lockport Marsh located at the confluence of Bayou d'Inde and the Calcasieu River Ship Channel.

## SECTION 3. SITE BACKGROUND

Industrial development has existed in the Lake Charles area since the early 1920s. Facility discharges, urban and agricultural activities, dredging, storm water runoff and accidental releases have impacted the Calcasieu Estuary. These same activities also have resulted in contaminated sediments within the various surface waters of the Calcasieu Estuary. Also, fish and shellfish within the Calcasieu Estuary have been impacted by industrial contaminants.

## SECTION 4. RISK ASSESSMENT/EVALUATION

### Human Health Risk Evaluation

As part of the Calcasieu Estuary Remedial Investigation conducted by EPA Region VI, the risk to human health was evaluated.

In the Human Health Risk Assessment, chemicals of concern (COC) in sediment, surface water, fish tissue, and shellfish tissue at Bayou d'Inde were quantitatively evaluated for potential health threats to human receptors via the ingestion and dermal pathways. Recreational users, commercial fishers, and residential and subsistence fish and shellfish consumers were evaluated under present and future land use conditions. The results of the human health risk assessment indicate:

- The total excess lifetime cancer risks for recreational fishers exposed to sediment and surface water were found to be within the acceptable risk range. In addition, noncancer health effects are not expected to occur from exposures to sediment and surface water in Bayou d'Inde.
- The total excess lifetime cancer risks from the consumption of fish and shellfish from Bayou d'Inde were above the acceptable range for residential and subsistence exposures. The majority of the estimated risk from fish and shellfish was due to the presence of dioxins/furans and polychlorinated biphenyls (PCBs) in shellfish tissue. Polychlorinated biphenyls were also found to exceed the threshold for noncancer health effects.

Based on the findings of the Human Health Risk Assessment for residential and subsistence fish and shell fish consumers, dioxins/furans and polychlorinated biphenyls in sediment were identified as COC for remediation. Remediation of the sediment in Bayou d'Inde will lower the surface-weighted average concentrations of dioxins, furans, and polychlorinated biphenyls which over time will result in acceptable COC concentrations for the recreational consumption of fish and shellfish in Bayou d'Inde. A biomonitoring program will be implemented to monitor COC concentrations in fish and shellfish tissue until they reach acceptable levels.

| **Human Health Risk Assessment Summary** | |
|---|---|
| **Receptors of concern:** | Residential and subsistence fish consumers |
| **Exposure pathway of concern:** | Consumption of fish and shellfish |
| **Chemicals of concern:** | Dioxins, furans, polychlorinated biphenyls |
| **Environmental medium to be remediated:** | Sediment |
| **Remedial goal:** | Acceptable COC concentrations in fish and shellfish in Bayou d'Inde |
| **Confirmation that remedial goals have been met:** | Regular biomonitoring of fish/shellfish in Bayou d'Inde until COC concentrations reach levels that are safe for consumption |

**Ecological Risk Evaluation**

As part of the Calcasieu Estuary Remedial Investigation conducted by EPA Region VI, the risk to ecological receptors was evaluated.

The Baseline Ecological Risk Assessment (BERA) evaluated the risks to: 1) aquatic organisms (microbes, plants, benthic invertebrates, benthic and pelagic fish) posed by exposure to water and sediment in Bayou d'Inde; and 2) aquatic-dependent wildlife (birds and mammals) based on their potential exposure to chemicals present in prey organisms in Bayou d'Inde. High, indeterminant, and low risk categories were used to express the level of risk to each group of aquatic-dependent organisms. The results of the BERA indicated that for Bayou d'Inde:

- The summary of risks to the aquatic receptors (microorganisms, aquatic plants, benthic invertebrates, and fish) indicate the predicted risk is low for 33% of the samples evaluated, indeterminate for 18% of the samples evaluated , and high for 49% of the samples evaluated; these risks are attributable to a variety of COC;
- The risk to carnivorous wading birds was categorized as low for all COC evaluated;
- The risk to sediment-probing birds was categorized as indeterminant for lead and low for the other COC evaluated ;
- The risk to piscivorus birds was categorized as indeterminant for dioxins, furans, polychlorinated biphenyls, and mercury and low for the other COC evaluated; and
- The risk to piscivorus mammals was categorized as high for polychlorinated biphenyls and low for the other COC evaluated.

Based on the findings of the BERA, dioxins/furans, polychlorinated biphenyls, and mercury in sediment were identified as COC for remediation. Remediation of the sediment in Bayou d'Inde will lower the surface-weighted average concentrations of dioxins, furans, polychlorinated biphenyls, and mercury which over time will lower the COC concentrations in the aquatic prey organisms for the piscivorus birds and mammals feeding at Bayou d'Inde thus lowering the risk to these receptors. A biomonitoring program will be implemented to monitor the reduction in COC concentrations in various classes of prey organisms.

| **Ecological Risk Assessment Summary** | |
|---|---|
| **Receptors of concern:** | Piscivorus birds and mammals |
| **Exposure pathway of concern:** | Consumption of aquatic organisms |
| **Chemicals of concern:** | Dioxins, furans, polychlorinated biphenyls, mercury |
| **Environmental medium to be remediated:** | Sediment |
| **Remedial goal:** | Reduced COC concentrations in prey organisms in Bayou d'Inde |
| **Confirmation that remedial goals have been met:** | Regular biomonitoring of prey organisms in Bayou d'Inde to document reduced COC concentrations in prey organisms |

## SECTION 5: EVALUATION AND SELECTION OF REMEDIAL ALTERNATIVES

The Bayou d'Inde Group conducted a Corrective Action Study (CAS) to evaluate remedial alternatives for the Bayou d'Inde Site. The Bayou d'Inde Group proposed dividing the Site into the following four Areas of Investigation (AOIs):

- AOI 1: The segment of Bayou d'Inde from its confluence with Little Bayou d'Inde to LA-108.
- AIO 2: The dredged main channel of Bayou d'Inde between LA-108 and its confluence with the Calcasieu River Ship Channel.
- AOI 3: The fringe marshes along the banks of Bayou d'Inde between LA-108 and the PPG Canal.
- AOI 4: Lockport Marsh, along both banks of Bayou d'Inde below the PPG Canal.

**AOI 1 Recommended Alternative**
In situ capping (bank to bank) of approximately 36, 000 square yards of sediment in the main channel using Articulated Block Mat (ABM) technology. The ABM consists of a 2-layer woven geotextile that is cable re-inforced and filled with cement grout. The ABM will have a final thickness of approximately 4 to 6 inches and will cover approximately 2,200 feet of the channel.

**AOI 2 Recommended Alternative**
Removal of approximately 97, 000 cubic yards of sediment in the main channel between the PPG Canal and the mouth of Bayou d'Inde essentially restoring the 1967 dredged channel in that reach. The dredged sediment will be consolidated into a portion of AOI 4 and capped with clean sediment.

**AOI 3 Recommended Alternative**
Placement of a 6-inch cover of clean sediment over approximately 39 acres of sediment in the fringe marshes (mostly open water areas). The cover will isolate the impacted sediments. The cover material will be dredged from a local sediment source.

**AOI 4 Recommended Alternative**
Placement of a 6-inch cover of clean sediment over approximately 123 acres of sediment in Lockport Marsh, including sediment consolidated from AOI 2 into a portion of AOI 4 bordered by oil field roads and the PPG Canal.

## SECTION 6. PATH FORWARD

The issuance of this "Draft" Decision Document (DDD) begins a forty five (45) day comment period. Comments should be addressed to:

Thomas F. Harris, Administrator
Remediation Services Division
P.O. Box 4314
Baton Rouge, LA 70821-4314

The written comments should contain the site's name **Bayou d'Inde Site** and the **Agency Interest Number (AI#) 7473.** LDEQ will consider the comments and information submitted during the public comments period and revise this Draft Decision Document as necessary and then issue a final decision.

Upon issuance of the Final Decision Document, PPG Industries, Inc., CITGO Petroleum Corporation, Occidental Chemical Corporation, and Westlake Polymers LP, will be required to submit a Remedial Design and Remedial Project Plan and then implement the remedies.

Signed this _____day of _____ 2010

By:

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Cheryl Sonnier Nolan
Assistant Secretary

# ATTACHMENT A

# DRAFT CORRECTIVE ACTION STUDY

# AUGUST 2009